

ACC NR: AP6028094

demonstrated that reducing the roughness of the surfaces of the channels makes it possible to reduce the expenditure of electric power. Orig. art. has: .4 figures.

SUB CODE: 20/ SUEM DATE: none/ ORIG REF: 004

Card

3/3

*epk*

ZHEMCHUGOV, Ya. M. and ZIL'BERMAN, A. N.

"So-Called Bottom Ice," Journal of Geophysics, No. 2, 1932.

AGAPOV, A.P.; ZHEMCHUZHIN, D.K.; VARENTSOV, V.S., insh., red.; LARIONOV,  
G.Ye., tekhn.red.

[Ridging fields for peat winning] Profilirovanie poley dobychi  
treshernogo torfa. Moskva, Gos.energ.izd-vo, 1958. 28 p.  
(Peat) (MIRA 12:3)

SOKOLOV, D.A., inzh.; ZHEMCHUZHIN, D.K., inzh.

Peat industry of the Leningrad Economic Council. Torf.prom. 37  
no.3:17-19 '60. (MIRA 13:9)

1. Lengostorf.  
(Leningrad Economic Region--Peat industry)

AUTHOR: Zhemchuzhin, D.K., Engineer SOV-118-58-9-6/19

TITLE: Complex Mechanization of Repair and Maintenance Operations in Peat Cutting Fields (Kompleksnaya mekhanizatsiya rabot po remontu i sodержaniyu poley dobychi frezernogo torfa)

PERIODICAL: Mekhanizatsiya trudoyemkikh i tyazhelykh rabot, 1958, Nr 9, pp 19-21 (USSR)

ABSTRACT: During peat mining operations, mechanization is carried out by new or modernized machinery. The article presents various machines used by the Predpriyatiya Lengostorfa (Lengostorf enterprises). For the rooting out, the RKSh stubbing machine with automatic rotor control is used, with a productivity of 4.5 ha per shift. In 1957, at the Torfopredpriyatiye Pel'gorskoye (The Pel'gorskoye Peat Enterprise), the KS stubbing machine was introduced, a suspended device mounted in front of the DT-54, with a mechanized lifting and lowering device, equipped with a BM-54 winch. By using PK loading cranes and TE-2M excavators, the loading of stubs is also mechanized. There are 6 photographs.

1. Peat--Production 2. Mines--Equipment

Card 1/1

ZHEMCHUZHIN, D.K.

Production of peat-mineral fertilizers at the peat works of  
the Leningrad State Trust of the Peat Industry. Trof. prom. 36  
no.7:5-7 '59. (MIRA 13:3)

1. Leningradskiy sovnarkhoz.

(Leningrad Economic Region--Peat)

(Leningrad Economic Region--Fertilizers and manures)

BERMAN, F.L.; ZHEMCHUZHIN, G.D.; BABUSHKIN, F.V.

Mechanization of the processes of grinding and screening of  
powders. Prom. khim. reak. i osobo chist. veshch. no.1:  
34-35 '63.  
(MIRA 17:2)

ZHEVCHUZHIN, G.V., inzh.

Sectional plastic mixers. Khim.mash. no.4:40-43 J1-Ag  
'60. (MIRA 13:7)

(Mixing machinery)

ZHEMCHUZHN, N. P.

"Experiment in Simultaneous Utilization of Luminescent and Radioactive Tracer Methods in the Study of Movement of Ocean Deposits for Purposes of Comparison."

report presented at the 7th International Conference on Coastal Engineering, The Hague, 21-27 Aug 1960.

Institut "United Seas Project" Min. of the Merchant Marine.

L 31811-66 EWT(m)/EWP(j) RM

ACC NR: AP6021679

SOURCE CODE: UR/0079/66/036/003/0480/0483

AUTHOR: Bliznyuk, N. K.; Kolomiyets, A. F.; Kyasha, Z. N.; Lovskaya, G. S.; Zhomchuzhin, S. G.

45  
B

ORG: All-Union Scientific Research Institute of Phytopathology (Vsesoyuznyy nauchno-issledovatel'skiy institut fitopatologii)

TITLE: Reaction of phenolates with ethylene chlorohydrin and dialkylchloro phosphates in aqueous solutions

SOURCE: Zhurnal obshechey khimii, v. 36, no. 3, 1966, 480-483

TOPIC TAGS: phenol, chlorohydrin, phosphate, aqueous solution, chemical synthesis, reaction rate, chemical kinetics

ABSTRACT: The synthesis of aryloxyethanols and dialkylaryl phosphates by the reaction of phenols with ethylene chlorohydrin and dialkylchlorophosphates, respectively, in the presence of aqueous alkalies was studied. A change in the order of mixing of the reagents was found to substantially increase the yields of the products. This was achieved by simultaneous synchronous addition of the alkyl (or acyl) halide and solution of alkali to the phenol at a temperature sufficient for a relatively rapid reaction. The rate of addition of the reagents in each concrete case was regulated so that the reacting substances would not accumulate in the reaction mixture during the

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UDC: 547.562:542.951.3/4:546.185

L 31811-66

ACC NR: AP6021679

process; the pH was maintained constant at a level close to neutral. The optimum temperature for the production of aryloxyethanols was the boiling point of the mixture, while that for dialkylaryl phosphates was found to be 0-25°. This change in the order of addition of the reagents is equivalent to conducting the reaction in a large excess of the phenol. Orig. art. has: 2 tables. [JPRS]

SUB CODE: 07 / SUBM DATE: 24Aug65 / ORIG REF: 003 / OTH REF: 006

Card 2/2 L5

PESHKOVA, V.M.; MEL'CHAKOVA, N.V.; ZHEMCHUZHIN, S.G.

Complex formation in the system benzoylacetone - zirconium -  
benzene - water, and hydrolysis of zirconium ions. Zhur.neorg.  
khim. 6 no.5:1233-1239 My '61. (MIRA 14;4)

(Butanedione)

(Zirconium compounds)

MYASNIKOV, Yu.A.; ZHEMCHUZHIN, Ye.K.; KHODZHASH, S.I.

Focus of tick-borne encephalitis in deciduous forests of  
Tula Province. Med. paraz. i paraz. bol. 32 no.3:354-355  
My-Je'63 (MIRA 17:3)

1. Iz Tul'skoy i Suvorovskoy sanitarno-epidemiologicheskoy  
stantsii.

THE MCHULZHINA, A.V.

TABLE I BOOK EXTRACTS 509/563

Method polyethylene 1 isomerically radiolabeled preparation, absolute  
stability (Methods for the Production and Measurement of Radio-  
active Preparations; Collection of Articles) Moscow, Akademstat,  
1960. 307 p. Extra 2115 inserted. 5,000 copies printed.  
General Ed.: Valeriy Viktorovich Bogdanov; M.: M.A. Saguro;  
Tech. Ed.: V.A. Vlasova.  
PURPOSE: This collection of articles is intended for scientific and  
technical personnel working in the production of radioactive iso-

topes.  
CONTENTS: The collection contains original articles on methods of  
obtaining and measuring radioactive preparations, according to  
the following: the articles contain new data, and are devoted to  
the practical interest to the extent that they discuss methodical  
difficulties in the collection of articles. In addition to several survey articles  
the collection contains discussions on the production of radio-  
active isotopes and isotopically radioactive preparations, including  
a number of carrier-free isotopes and several colloidal and other  
therapeutic preparations. Also discussed are methods for prepa-  
ration of a number of tagged organic compounds, problems in the analy-  
sis of tagged organic compounds, the absolute and relative measure-  
ment of activity, and the radioelectric analysis of preparations.  
New instruments and methods are described and instructions con-  
cerning measurement equipment and techniques are included. The con-  
tents of the collection are: V.F. Shubov, Candidate of Sciences, En-  
gineer, Institute of Chemical Sciences, V.F. Shubov, Candidate of Sciences,  
and V.I. Shostak, Candidate of Chemical Sciences, are mentioned  
as having helped directly in the selection and preparation of the  
material for publication. References accompany each article.

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ZHEMCHUKHINA, Y. A.

BELYAYEV, A. I.; ZHEMCHUKHINA, Y. A.; PADAIKA, Ye. N., kandidat tekhnicheskikh nauk; retsenzent; GULYANITSKIY, B. S., inzhener, retsenzent; DOKUKINA, Ye. V., redaktor; CHETVERIKOVA, L., tekhnicheskiy redaktor.

[Surface phenomena in metallurgical processes] Poverkhnostnye yavleniya v metallurgicheskikh protsessakh. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po cherno i tsvetnoi metallurgii, 1952. 143 p. [Micro-film] (MLRA 7:10)

(Metallurgy) (Surfaces (Technology)) (Surface chemistry)

1. BELYAYEV, A.I.; FIRSANOVA, L.A.; ZHEMCHUZHINA, Ye.A.

Unsuppressed anode effects. TSvet.met.27 no.3:35-41 My..Je '54.  
(MIRA 10:10)

1. Mintsvetmetzoloto.

(Aluminum--Electrometallurgy)

"APPROVED FOR RELEASE: 03/15/2001

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APPROVED FOR RELEASE: 03/15/2001

CIA-RDP86-00513R002064710015-5"

ЗНАКОПЛЕНИА, ЯЛЕНА АЛЕКСАНДРОВНА  
BELYAYEV, Anatoliy Ivanovich; ZHEMCHUZHINA, Yelena Aleksandrovna;  
KOSOLAPOVA, E.F., red.; MIKHAYLOVA, V.V., tekhn.red.

[Microscopic analysis of carbon materials and electrodes]  
Mikroskopicheskiy analiz uglerodistykh materialov i elektrodov.  
Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi  
metallurgii, 1957. 75 p. (MIRA 11:1)  
(Coal) (Electrodes)

ХЕМИЧЕСКАЯ, ЯЕЛЕНА А.

BELYAYEV, Anatoliy Ivanovich; ZHEMCHUZHINA, Yelena Aleksandrovna; FIEBANOVA, Lidiya Alekseyevna; SKLYARENKO, S.I., professor, doktor, retsenzent; KRISTOVNIKOV, A.N., professor, doktor, retsenzent; CHERNOV, A.N., redaktor; ARKHANGEL'SKAYA, M.S., redaktor izdatel'stva; ATTOPOVICH, M.K., tekhnicheskii redaktor

[Physical chemistry of soluble salts] Fizicheskaya khimiya rasplavlennyykh solsi. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957. 359 p. (MIRA 10:11)  
(Salts, Soluble)

*Zhemchuzhina*  
LAKERNIK, Mark Moiseyevich; SEVRYUKOV, Nikolay Nikolayevich; BELYAYEV, A.I.,  
prof., dokt.; retsenzent; VELLER, R.L., kand.tekhn.nauk; retsenzent;  
VANYUKOV, A.V., retsenzent; KROL', L.Ya., retsenzent; SAMSONOV, G.V.,  
retsenzent; LEONIDOV, N.K., inzh., retsenzent; ZHEMCHUZHINA, Ye.A.,  
red.; EL'KINA, L.M., red.izdatel'stva; MIKHAYLOVA, V.V., tekhn.red.

[Metallurgy of nonferrous metals] Metallurgiya tsvetnykh metallov.  
Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po cherno i tsvetnoi  
metallurgii, 1957. 535 p. (MIRA 11:1)  
(Nonferrous metals--Metallurgy)

137-58-4-6569

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 36 (USSR)

AUTHORS: Belyayev, A. I., Zhemchuzhina, Ye. A., Firsanova, L. A.

TITLE: An Investigation of the Physical Chemical Properties of Aluminum Bath Electrolyte Containing Magnesium Fluoride (Issledovaniye fiziko-khimicheskikh svoystv elektrolita alyuminiyevykh vann, soderzhashchego storistyy magniy)

PERIODICAL: Sb. nauchn tr. Mosk. in-t tsvetn-met. i zolota i VNITO tsvetn. metallurgii, 1957, Nr 26, pp 143-161

ABSTRACT: MgF depresses the temperature of onset of crystallization of NaF+AlF<sub>3</sub> melts more than does CaF<sub>2</sub>. The rate of solution of Al<sub>2</sub>O<sub>3</sub> in melts containing MgF<sub>2</sub> is higher than that of melts containing CaF<sub>2</sub>. MgF<sub>2</sub> increases the wetting angle of coal by NaF+AlF<sub>3</sub> melts more than does CaF<sub>2</sub>. The critical D of melts of NaF+AlF<sub>3</sub> with added MgF<sub>2</sub> is greater than the critical D of the same melts containing CaF. Losses of Al in melts of NaF+AlF<sub>3</sub> with added MgF<sub>2</sub> are smaller than the losses of Al in melts with added CaF<sub>2</sub>. When direct current is superimposed, the losses depend upon the D<sub>k</sub>, while when

Card 1/2

137-58-4-6569

An Investigation of the Physical (cont.)

$D > 0.2$  amps/cm<sup>2</sup>, Al losses diminish. Liberation of Na at the cathode is diminished somewhat by adding either CaF<sub>2</sub> or MgF<sub>2</sub>. The density of NaF+AlF<sub>3</sub> melts increases under the effect of MgF<sub>2</sub> to a lesser degree than under the effect of CaF<sub>2</sub>. The electric conductivity of NaF+AlF<sub>3</sub> melts diminishes under the effect of addition of 5% CaF<sub>2</sub>+5% MgF<sub>2</sub> a little more than under the effect of addition of 7% CaF<sub>2</sub>. On the whole, MgF<sub>2</sub> exercises a more favorable effect on the physical chemical properties of the electrolyte in Al baths than does CaF<sub>2</sub>, and it is therefore desirable to use MgF<sub>2</sub> as a component of the electrolyte.

I.G.

1. Aluminum coatings
2. Electrolytes--Properties--Analysis

Card 2/2

*ZHEMCHUZHINA, E. H.*

AUTHOR: Belyaev, A.I., Zhemchuzhina, E.A. and Firsanova, I.A. <sup>136-5-11/14</sup>

TITLE: Tests of magnesium fluoride as a component of aluminium-bath electrolyte. (Ispytaniya ftoristogo magniya kak komponenta elektrolita alyuminievykh vann.)

PERIODICAL: "Tsvetnye Metally" (Non-ferrous Metals), 1957, No.5, pp. 70 - 74 (U.S.S.R.)

ABSTRACT: In the first section of this work laboratory experiments to elucidate the joint influence of magnesium and calcium fluorides on the properties of aluminium-bath electrolyte are described. The results are shown graphically as a fusion diagram for the quasi-binary system:  $[2.5 \text{ NaF} \cdot \text{AlF}_3 + 5 \text{ wt } \% \text{ CaF}_2 + 5 \text{ wt } \% \text{ MgF}_2] - \text{Al}_2\text{O}_3$ ; as a graph showing the influence of magnesite calcining temperature on the rate of its solution in cryolite melts at 1 000 and 1 020 °C; and as plots of solubility of aluminium in the electrolyte, solubility of alumina, angle of wetting, conductivity, density and melting point against the weight % of  $\text{CaF}_2$  and  $\text{MgF}_2$ . The laboratory results indicate electrolytes should contain 6.5 - 7%  $\text{MgF}_2$  for a total content of the fluoride of up to 10 wt %, a suitable cryolite ratio being 2.5 - 2.6. The second part of the paper deals with full scale tests of magnesium-fluoride

Card 1/2

Tests of magnesium fluoride as a component of aluminium-bath electrolyte. (Cont.) 136-5-11/14

containing electrolytes, started at the Ural Aluminium Works (Uralskom Alyuminievom Zavode) in 1955 and is still continuing. These tests have shown the following favourable effects of  $MgF_2$  additions: increased yield with respect to current and energy; a lower bath working temperature; decreased consumption of anodic material; higher  $CO_2$  content in the anodic gases; lower consumption of aluminium fluoride; better operating conditions and improved working of the bath. Reasons for these effects are discussed and it is noted that favourable effects have also been obtained at aluminium works in Czechoslovakia and at Fushun in China (Chu Tzu Sen. "Influence of magnesium fluoride on the electrolysis of cryolite-alumina melts". Dissertation, Mukden, 1956.). At the latter works, sixteen  $MgF_2$ -containing baths are working at the present time. There are 7 references, 5 of which are Slavic.

Card 2/2

ASSOCIATION: Mintsvetmetzoloto.

AVAILABLE:

ZHEMCHUSHNAYA, Ye.; MEYLAKHS, M., master sporta, rekordsmen SSSR; BARANOVA, A.

Facts, events, people. Kryl.rod. 11 no.7:12-13 JI. '60.

(MIRA 13:7)

1. Inzhener otдела obsluzhivaniya Aeroflota (for Zhemchushnaya).  
(Aeronautics)

ZHEMCHUZHNIKOV, Georgiy Vladimirovich; PATON, B.Ye., otv.red.; ASNIS,  
A.Ye., red.; KAZIMIROV, A.A., red.; MEDOVAR, B.I., red.;  
PODGAYETSKIY, V.V., red.; MANDEL'BERG, S.L., kand.tekhn.nauk, red.  
MAYEVSKIY, V.V., red.; GORNOSTAYPOL'SKAYA, M.S., tekhn.red.

[Welding of metal structures] Svarka metallokonstruktsii.  
Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1960. 73 p.  
(MIRA 14:1)

(Structural frames--Welding)

18(4)

AUTHORS:

Belyayev, A. I., Zhamchuzhina, Ye. A. SOV/163-58-4-16/47

TITLE:

Investigation of the Leaching of North Ural Bauxites by Highly Concentrated Caustic Soda Solutions at Atmospheric Pressure (Issledovaniye vyshchelachivaniya severoural'skikh boksitov vysokokontsentrirrovannymi rastvorami yedkogo natra pri atmosfernom davlenii)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4, pp 94 - 100 (USSR)

ABSTRACT:

This investigation concerned the intensification of bauxite leaching by increasing the concentration of the alkaline solution and by increasing the boiling temperature under atmospheric pressure. The investigation also concerned the possibility of decomposing North Ural bauxites by melted caustic soda (with a subsequent leaching of the agglomerate formed by boiling water), as well as decomposition of the same bauxites by concentrated solutions of caustic soda at different temperatures and atmospheric pressure.- The North Ural bauxites investigated had the following composition: 57.6%  $Al_2O_3$ , 18.96%  $Fe_2O_3$ , 6.24%  $SiO_2$ , 2.34%  $TiO_2$ , remainder

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Investigation of the Leaching of North Ural  
Bauxites by Highly Concentrated Caustic Soda  
Solutions at Atmospheric Pressure

SOV/163-58-4-16/47

-13.8%. The mineralogical composition was determined by means of thermal and X-ray structure analyses. The output of aluminum oxide increases with the rise of temperature and reaches 82% at 450°. The endothermic effect of the dehydration of diaspores (a hydrous aluminum oxide) contained in red mud due to the incomplete decomposition of the bauxite decreases with the rise of temperature. The maximum endothermic effect is observed at 350°, it is much smaller at 400° and disappears completely at 450 and 500°. The endothermic effect of the dehydration of sodium aluminum silicate increases, however, with the rise of temperature (temperature of the interaction between the bauxite and the melted caustic soda). (The sodium aluminum silicate is formed at the leaching of the bauxite.)- To investigate the influence of temperature on the leaching of North Ural bauxite at atmospheric pressure, concentrated caustic soda solutions with high boiling points were used. The data obtained show that temperature has an essential influence on the output of the aluminum oxide  $Al_2O_3$

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Investigation of the Leaching of North Ural  
Bauxites by Highly Concentrated Caustic Soda  
Solutions at Atmospheric Pressure

SOV/163-58-4-16/47

from bauxite: the output was 80% at 156° and about 86% at  
174°. There are 5 figures, 1 table, and 2 Soviet references.

ASSOCIATION:

Moskovskiy institut tsvetnykh metallov i zolota (Moscow  
Institute of Nonferrous Metals and Gold)

SUBMITTED:

January 22, 1958

Card 3/3

18: (5)

AUTHORS:

Zhemohuzhina, Ye. A., Belyayev, A. I.

SOV/163-59-2-10/48

TITLE:

The Influence of the Ratio of  $\text{CaF}_2$  and  $\text{MgF}_2$  to Cryolite on the Solution Rate of  $\gamma$ - and  $\alpha$ - $\text{Al}_2\text{O}_3$  in Cryolite Melts (Vliyaniye kriolitovogo otnosheniya  $\text{CaF}_2$  i  $\text{MgF}_2$  na skorost' rastvoreniya  $\gamma$ - i  $\alpha$ - $\text{Al}_2\text{O}_3$  v kriolitovykh rasplavakh)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 2, pp 56-60 (USSR)

ABSTRACT:

The solution rate of  $\gamma$ - and  $\alpha$ - $\text{Al}_2\text{O}_3$  in pure  $\text{NaF}+\text{AlF}_3$  melts was investigated and the results are given in figure 1. Results show that  $\gamma$ - $\text{Al}_2\text{O}_3$  is more quickly solved in the  $\text{NaF}+\text{AlF}_3$  melt than  $\alpha$ - $\text{Al}_2\text{O}_3$ . The solution rate of  $\gamma$ - as well as of  $\alpha$ - $\text{Al}_2\text{O}_3$  rises with the increase of the cryolite ratio. The solution rate of  $\gamma$ - $\text{Al}_2\text{O}_3$  in melts with different cryolite concentrations and changing ratio between  $\text{CaF}_2$  and  $\text{MgF}_2$  was investigated and the results are given in figure 2. From the course of the

Card 1/2

The Influence of the Ratio of  $\text{CaF}_2$  and  $\text{MgF}_2$  to  
Cryolite on the Solution Rate of  $\gamma$ - and  $\alpha$ - $\text{Al}_2\text{O}_3$  in Cryolite Melts

SOV/163-59-2-10/48

curves it is concluded that  $\gamma$ - $\text{Al}_2\text{O}_3$  is solved more quickly in melts with higher  $\text{MgF}_2$ -content (Fig 3). The solution rate of  $\alpha$ - $\text{Al}_2\text{O}_3$  in melts with different cryolite ratio and changing ratio between  $\text{MgF}_2$  and  $\text{CaF}_2$  was investigated (Fig 4). The solution rate of  $\alpha$ - $\text{Al}_2\text{O}_3$  changes only inconsiderably in the case of a change in the cryolite ratio and in the presence of calcium- and magnesium fluorides. The solution rate of  $\gamma$ - $\text{Al}_2\text{O}_3$  is higher than that of  $\alpha$ - $\text{Al}_2\text{O}_3$  in the presence of  $\text{MgF}_2$  and  $\text{CaF}_2$  in pure  $\text{NaF}+\text{AlF}_3$ -melts. There are 5 figures and 6 references, 4 of which are Soviet, 1 English and 1 Hungarian.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota (Moscow  
Institute of Nonferrous Metals and Gold)

PRESENTED:  
Card 2/2

July 31, 1958

18(4)

AUTHORS:

Zhemchuzhina, Ye. A., Belyayev, A. I.

SOV/163-59-2-11/48

TITLE:

Investigation of the Losses of Magnesium in Its Electrolytic Production (Issledovaniye poter' magniya pri yego elektroliticheskom poluchenii)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 2, pp 61-64 (USSR)

ABSTRACT:

As a rule, the yield of magnesium in its electrolytic production is 85%. The loss of 15% is caused by secondary processes. The influences of the following factors are investigated: 1) Reaction between magnesium and electrolyte. 2) Oxidation by atmospheric oxygen on the surface of the electrolyte. 3) Reaction with chlorine, and 4) influence of the applied potential. The reaction between magnesium and the electrolyte and atmospheric oxygen was investigated by placing magnesium rods weighing 5 g into the salt melt. The loss of magnesium in percent by weight was ascertained after 1 hour. By repeating the experiment in argon atmosphere, the fraction of the oxidation by atmospheric oxygen could be determined as a difference. Figure 1 shows the dependence of the magnesium loss on the sodium chloride content of the melt, and the

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SOV/163-59-2-11/48

Investigation of the Losses of Magnesium in Its Electrolytic Production

fraction falling to the oxidation. The reaction:  $Mg + 2NaCl = MgCl_2 + 2Na$  is indicated as a cause of the losses in sodium-chloride melt. The influence of the chlorine settling on the anode was investigated by the blowing through of chlorine. Figure 2 shows that the magnesium loss by the reaction with chlorine is proportional to the current velocity of the chlorine. Figure 3 shows the influence of the cathode potential on the magnesium loss. The terminal voltage was varied between 0.01 and 3.0 v. The maximum loss lies at 0.5 v. This maximum corresponds to the beginning discharge of monovalent  $Mg^+$ -ions on the cathode. At 2.8 v, the decomposition voltage of the magnesium chloride, the losses only amounted to 0.12%. There are 3 figures.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota  
(Moscow Institute for Nonferrous Metals and Gold)

SUBMITTED: June 16, 1958

Card 2/2

BELYAYEV, A.I.; ZHEMCHUZHINA, Ye.A.

Conference on inorganic chemistry in Bratislava. Izv.vys.  
ucheb.zav.; tsvet.met. 2 no.6:201-202 '59.

(MIRA 13:4)

(Chemistry, Inorganic--Congresses)

5.4600, 18.3000

77724  
SOV/149-60-1-13/27

AUTHORS: Belyayev, A. I., Zhemchuzhina, Ye. A.

TITLE: Investigation of Effect of Graphite and Salt Additives on Quality of Anode Mass

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Tsvetnaya metallurgiya, 1960, Nr 1, pp 97-100 (USSR)

ABSTRACT: Graphite (natural and artificial),  $\text{NaCl}$ ,  $\text{NaF} + \text{AlF}_3$  (in molar ratio 4:1), and a salt mixture (60%  $\text{BaCl}_2 + 40\% \text{NaCl}$ ) were compounded with coke (coal or petroleum) and binder (pitch), and baked and tested for electrical conductivity, mechanical strength, crumbling, and oxidation. The results are shown in Figs. 1-4. The authors note that the resistivity of anodes at room temperature decreases with salt additions since at room temperatures, these salts are solid. When fused and highly conductive (as during the actual electrolysis) the resistivity will be even lower. The

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Investigation of Effect of Graphite  
and Salt Additives on Quality of Anode  
Mass

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crumbling test was carried out by heating specimen to 1,000° for one hour and weighing the crumbled portion. At the same time the oxidation of samples was determined by establishing their weight loss. The authors conclude that for better conductivity and lower oxidation rate, 10% artificial or natural graphite should be added to the dry weight of the anode mass. The collaboration of V. A. Sazhina (senior laboratory assistant) is acknowledged. There are 4 figures. Krasnoyarsk Institute of Nonferrous Metals. Chair of Metallurgy of Light Metals (Krasnoyarskiy institut Tsvenykh metallo. Kafedra metallurgiyi legkikh metallo)

ASSOCIATION:

SUBMITTED:

April 10, 1959

Card 2/6

Investigation of Effect of Graphite and  
Salt Additives on Quality of Anode Mass

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SOV/149-60-1-13/27

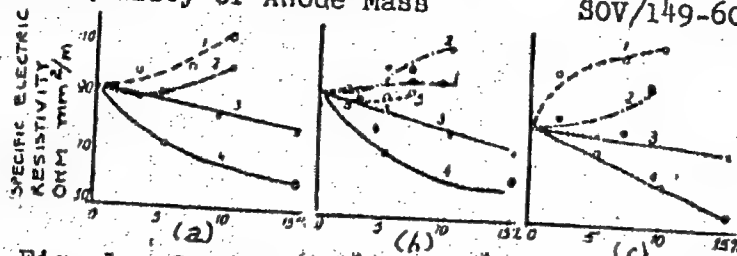


Fig. 1. Specific electric resistivity of anode mass prepared from cokes: pitch (a) petroleum (b) and their mixture (c) versus influence of additives: (1) NaCl; (2) NaF + AlF<sub>3</sub>; (3) artificial graphite; (4) natural graphite; (5) BaCl<sub>2</sub> + NaCl.

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Investigation of Effect of Graphite and  
Salt Additives on Quality of Anode Mass

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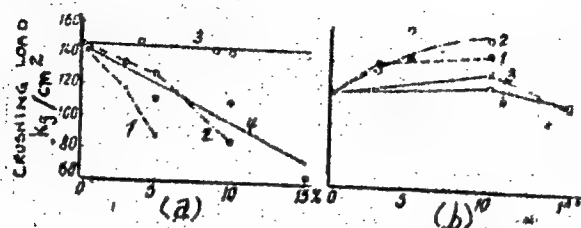


Fig. 2. Mechanical strength of anode mass prepared from petroleum coke (a) a mixture of pitch and petroleum coke, (b) versus influence of additives: (1) NaCl; (2) NaF + AlF<sub>3</sub>; (3) artificial graphite; (4) natural graphite.

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Investigation of Effect of Graphite and  
Salt Additives on Quality of Anode Mass

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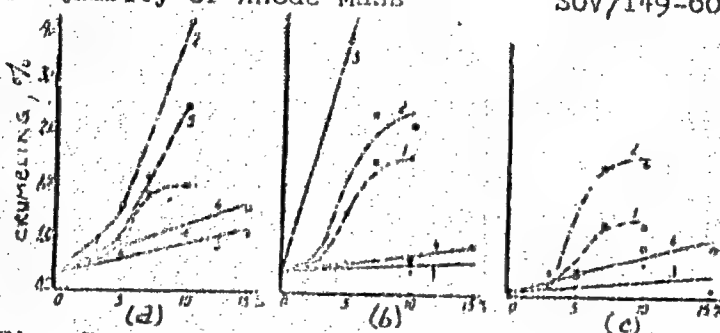


Fig. 3. Crumbling of anode mass prepared from  
pitch (a) and petroleum (b) cokes, as well as from  
their mixture (c), versus influence of additives:  
(1) NaCl; (2) NaF +  $AlF_3$ ; (3) artificial graphite;  
(4) natural graphite; (5)  $BaCl_2$  + NaCl.

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# Investigation of Effect of Graphite and Salt Additives on Quality of Anode Mass

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SOV/149-60-1-13/27

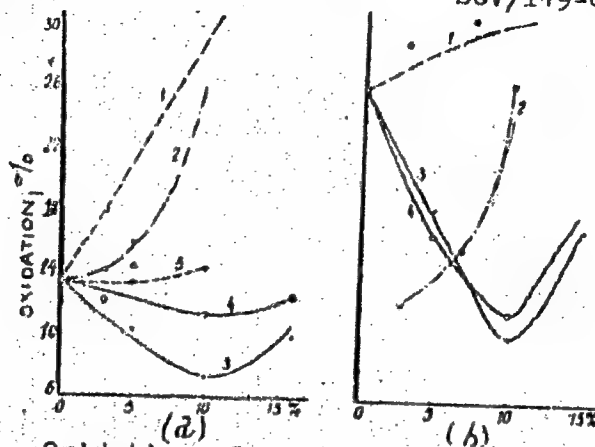


Fig. 4. Oxidation of anode mass prepared from pitch coke (a), from a mixture of pitch and petroleum coke (b), versus influence of additions: (1) NaCl; (2)  $AlF_3$ ; (3) artificial graphite; (4) natural graphite; (5)  $BaCl_2 + NaCl$ .

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S/136/60/000/04/011/025  
EO91/E235

AUTHORS: Belyayev, A. I., and Zhemchuzhina, Ye. A

TITLE: Properties of Industrial Aluminium Cell Electrolytes  
Containing Magnesium Fluoride

PERIODICAL: Tsvetnyye metally, 1960, Nr 4, pp 45-48 (USSR)

ABSTRACT: The aim of the investigation was to determine the most important physical and chemical properties of industrial electrolytes containing magnesium fluoride and to make a comparison between the properties of such electrolytes and electrolytes not containing magnesium fluoride. At an aluminium plant working with additions of caustic magnesite, samples of electrolyte were taken from 44 vats approximately 1 hour before operation and their fusibility, density, electrical conductivity and volatility were tested. The cryolite ratio of these electrolytes was 2.2 to 2.78 and the  $MgF_2$  content was 2.56 to 7.6%. The average  $CaF_2$  content was 3.5 to 4%. The fusibility of the above electrolytes is shown in Table 1. The temperature at which  $MgF_2$ -free electrolytes crystallise is higher by approximately 30 to 35°C than that of electrolytes containing  $MgF_2$  (see Table 2). The density

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S/136/60/000/04/011/025  
E091/E235**Properties of Industrial Aluminium Cell Electrolytes Containing Magnesium Fluoride**

of electrolyte samples taken from the vats and shown in Table 2 was determined in the molten state by hydrostatic weighing. No distinct relationship was found to exist between the density of the electrolyte, the cryolite ratio and the  $MgF_2$  content. However, on raising the  $MgF_2$  content, the density usually increases and this increase may precede the decrease in density of the melt by lowering the cryolite ratio. At a certain  $MgF_2$  content, electrolytes with a higher cryolite ratio can have a lower density than electrolytes with a lower cryolite ratio if their  $MgF_2$  content is high (Table 3, Fig 1) In Table 4 the results of specific electrical conductivity measurements are shown for electrolyte samples from DAZ vats working with caustic magnesite additions. Fig 2 shows the relationship between specific electrical conductivity and temperature of electrolytes containing  $MgF_2$ . The specific electrical conductivity at  $1000^{\circ}C$  of electrolytes containing various percentages of  $MgF_2$  is shown in Table 5. The volatility of industrial electrolytes, as well as of synthetic ones, at a constant

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S/136/60/000/04/011/025  
EO91/E235

Properties of Industrial Aluminium Cell Electrolytes Containing Magnesium Fluoride

cryolite ratio decreases as the  $MgF_2$  concentration increases. On increasing the  $MgF_2$  from 3.5 to 6% the volatility of the electrolyte decreases noticeably (Fig 3). The authors arrive at the following conclusions: 1 - Electrolytes of industrial aluminium cells containing  $MgF_2$  have a lower melting point, approximately the same density and a somewhat lower electrical conductivity and volatility than those without  $MgF_2$ ; 2 - The following conditions are favourable for the application of  $MgF_2$  as one of the constituents of industrial aluminium electrolytes: cryolite ratio = 2.5 to 2.65 and  $MgF_2$  = 5 to 5.5%. Such an electrolyte crystallises at 930 to 935°C (i.e. 30 to 35°C below the melting point of a similar electrolyte without  $MgF_2$ ); it has a density of 2.090 to 2.036 g/cm<sup>3</sup> (i.e. practically the same as a corresponding electrolyte free from  $MgF_2$ ) and an electrical conductivity of 1.97 to 2.07 ohm<sup>-1</sup>.cm<sup>-1</sup> (i.e. lower by 0.16 to 0.14 ohm<sup>-1</sup>.cm<sup>-1</sup> than that of an analogous electrolyte free from  $MgF_2$ ).

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S/136/60/000/04/011/025  
E091/E235

Properties of Industrial Aluminium Cell Electrolytes Containing  
Magnesium Fluoride

V. A. Sazhina and V. N. Chechentsev assisted in the  
experimental work. There are 3 figures, 5 tables and  
2 Soviet references.

ASSOCIATION: Institut tsvetnykh metallov (Institute of Non-Ferrous  
Metals)

Card 4/4



L 46040-66 EWT(m)/ENP(t)/ETI LJP(c) JD/JG/WB

ACC NR: AT6022716

SOURCE CODE: UR/2848/66/000/041/0316/0321

AUTHORS: Kazakevich, Z. A.; Zhemchuzhina, Ye. A. 59  
B+

ORG: Moscow Institute for Steel and Alloys, Department for Manufacture of Pure Metals and Semiconductor Materials (Moskovskiy institut stali i splavov, kafedra proizvodstva chistyykh metallov i poluprovodnikovyykh materialov)

TITLE: Wetting of high melting metals with a silver-copper alloy

SOURCE: Moscow. Institut stali i splavov. Sbornik, no. 41, 1966. Fizicheskaya khimiya metallurgicheskikh protsessov i sistem (Physical chemistry of metallurgical processes and systems), 316-321

TOPIC TAGS: titanium, niobium, molybdenum, titanium oxide, silver containing alloy, copper containing alloy, surface tension

ABSTRACT: The angle of contact between Ti, Mo, and Nb and the silver-copper alloy (eutectic mixture: 72% Ag, 28% Cu) was determined. The experimental procedure followed that of A. I. Belyayev and Ye. A. Zhemchuzhina (Poverkhnostnyye yavleniya v metallurgicheskikh protsessakh, Metallurgizdat, 1962). The experimental results are shown graphically (see Fig. 1). The effect of oxide films of different thicknesses on the surface of Ti upon the wettability of the latter by the Ag-Cu alloy was also studied. The specimens were oxidized in air at 800 and 900C for a period of 30, 60, and 120 min. The results are shown graphically, (see Fig. 2). It is concluded that the rate of wetting of oxide-coated Ti specimens by Ag--Cu alloy depends, to some

Card 1/3

L-16040-55

ACC NR: AT6022716

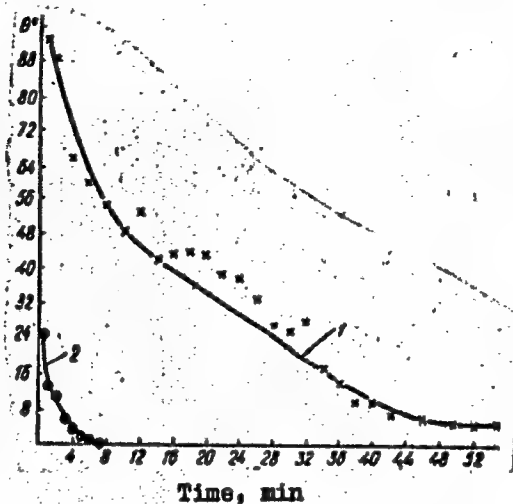


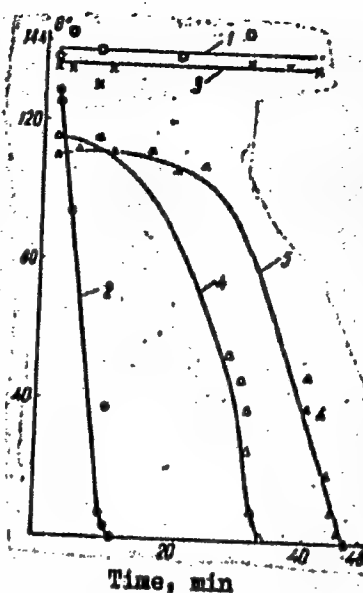
Fig. 1. Change in the contact angle as a function of time during wetting of Ti specimens by Ag-Cu alloy: 1 - 800C; 2 - 850C.

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L 46040-66

ACC NR: AT6022716

Fig. 2. Change in the contact angle as a function of time during wetting of Ti specimen oxidized in air at 800C by Ag-Cu alloy. Duration of oxidation in min and oxidation temperature respectively: 1 - 30, 800C; 2 - 30, 900; 3 - 60, 800; 4 - 60, 900; 5 - 120, 900.



extent, on the rate of solubility of the oxide coat in the alloy. Orig. art. has: 5 graphs.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002/ OTH REF: 001

Card 3/3 LS

L 66041-66 ENT(m)/EMP(v)/T/EMP(t)/ETI/EMP(k) LIP(c) ID/HH/ID/MP

ACC NR: AT6022717

SOURCE CODE: UR/2848/66/000/041/0420/0427

AUTHOR: Zhemchuzhina, Ye. A.

ORG: Moscow Institute for Steel and Alloys, Department of Manufacture of Pure Metals and Semiconductor Materials (Moskovskiy institut stali i splavov, Kafedra proizvodstva chistykh metallov i poluprovodnikovyykh materialov)

TITLE: Investigation of the welding of tungsten<sup>2</sup> and molybdenum<sup>2</sup> by melts of pure gold and pure silver<sup>2</sup>, as well as by these metals alloyed with platinum<sup>2</sup>

SOURCE: Moscow. Institut stali i splavov. Sbornik, no. 41, 1966. Fizicheskaya khimiya metallurgicheskikh protsessov i sistem (Physical chemistry of metallurgical processes and systems), 420-427

TOPIC TAGS: tungsten, molybdenum, gold, silver, platinum containing alloy, surface tension

ABSTRACT: The wetting of solid surfaces of W and Mo by molten gold and silver and by molten platinum alloys of these metals was studied. The contact angles were determined by means of the installation shown in Fig. 1. The experimental results are presented graphically (see Fig. 2). It was found that the wettability of W and Mo by the molten metals<sup>6</sup> and by their Pt alloys followed the following series in the order of increased wettability

Tungsten  
 $\theta^\circ$  after 15 min  $\xrightarrow{\text{Ag (122)}} \xrightarrow{\text{Au (131)}} \xrightarrow{\text{Au + 5\% Pt (117)}} \xrightarrow{\text{Ag + 12\% Pt (12)}}$

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ACC NR: AT6022717

Molybdenum  
 $\theta^{\circ}$  after 15 min  $\xrightarrow{\text{Au (115}^{\circ})}$   $\rightarrow \text{Au + 5\% Pt (73}^{\circ})$   $\rightarrow \text{Ag + 12\% Pt (66}^{\circ})$   $\rightarrow \text{Ag (64}^{\circ})$

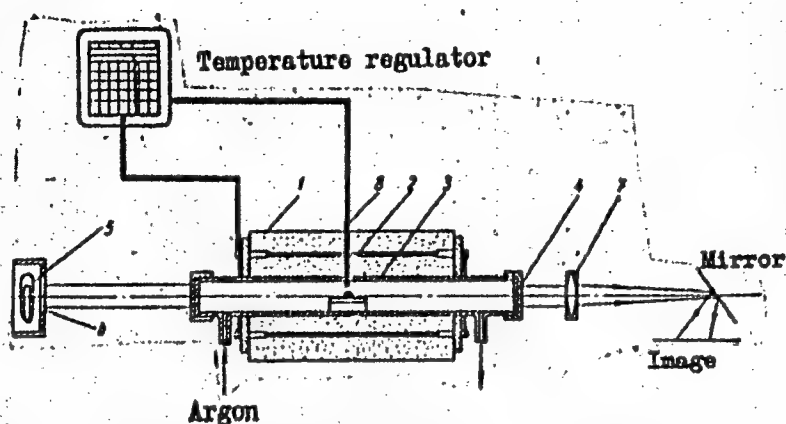


Fig. 1. Apparatus for the determination of contact angles.  
 1 - tube furnace; 2 - silit heater; 3 - stainless steel tube; 4 - quartz windows; 5 - light source; 6 and 7 - lenses; 8 - Pt--Rh thermocouple.

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L 16041-66

ACC NR: AT6022717

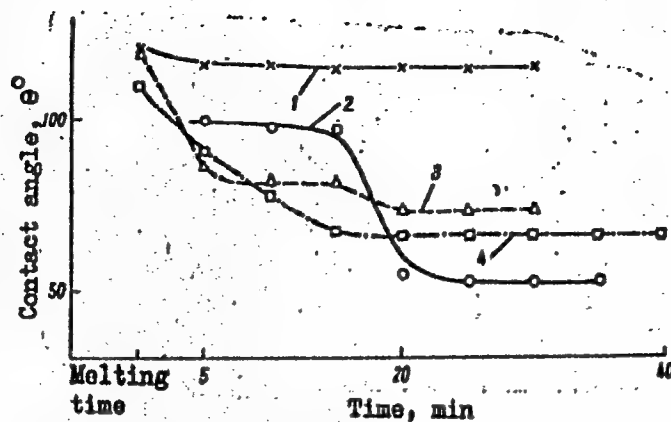


Fig. 2. Effect of the addition of platinum on the wettability of molybdenum by gold and silver. 1 - Au; 2 - Ag; 3 - Au + 5% Pt; 4 - Ag + 12% Pt.

Orig. art. has: 1 table, 8 graphs, and 1 equation.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 001/ OTH REF: 003

Joining of dissimilar metals

Card 3/3

L 09069-67 EWT(m)/EWP(t)/ETI IJP(o) JD

ACC NR: AT6022715

SOURCE CODE: UR/2840/66/000/041/0311/0315

AUTHORS: Polistanskiy, Yu. O.; Zhemchuzhina, Ye. A.; Baturlin, A. I. 12

ORG: Moscow Institute for Steel and Alloys, Department for Manufacture of Pure Metals and Semiconductor Materials (Moskovskiy institut stali i splavov, Kafedra proizvodstva chistyykh metallov i poluprovodnikovyykh materialov)

TITLE: Synthesis and alloying of lead telluride

SOURCE: Moscow. Institut stali i splavov. Sbornik, no. 41, 1966. Fizicheskaya khimiya metallurgicheskikh protsessov i sistem (Physical chemistry of metallurgical processes and systems), 311-315

TOPIC TAGS: lead containing alloy, tellurium containing alloy, sodium containing alloy, semiconductivity

ABSTRACT: The synthesis of lead telluride was carried out by four different methods: a) heating a stoichiometric mixture of Pb and Te in quartz ampules at 900C for 30 min; b) heating a mixture of Pb and Te at 950C for 20 min (15% excess of Te over the stoichiometric composition) in the presence of B<sub>2</sub>O<sub>3</sub> flux; c) heating a mixture of Pb and Te at 950C for 20 min (5.5% excess Te) in the presence of NaCl flux, and d) heating a mixture of Pb and Te at 950C for 20 min (5.5% excess Te) in the presence of NaCl - Na<sub>2</sub>CO<sub>3</sub> eutectic mixture as flux. The thermal emf and electrical conductivity of each product obtained by the different synthetic methods are tabulated. In addition, the properties of the "P" type conductor obtained by introducing Na into

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L 09069-67

ACC NR: AT6022715

PbTe were studied. The Na was introduced into the PbTe either directly, in the elemental state, or in form of lead-sodium amalgam. The experimental results are presented in graphs and tables (see Fig. 1). The experimental results confirm

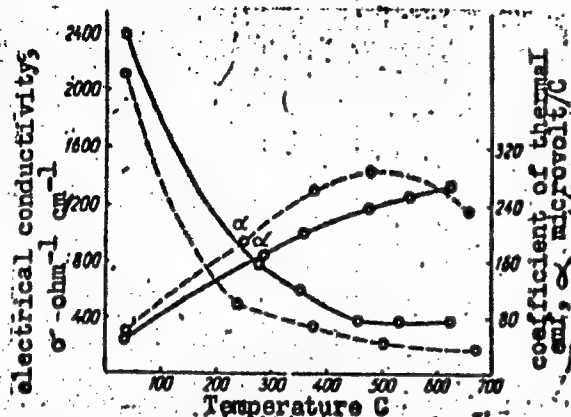


Fig. 1. Temperature dependence of the thermal emf coefficient and specific conductivity of lead telluride "P" type conductor (sodium content in the lead telluride equals 0.1 wt %).

Wagner's theory regarding the mechanism for the sodium addition to PbTe (Sb. Termoelektricheskiye materialy i preobrazovaniya, Izd-vo Mir, 1964). Orig. art. has: 1 table, 1 graph, and 2 equations.

SUB CODE: 11/

SUBM DATE: none/

ORIG REF: 002/

OTH REF: 001

Card 2/2 nat

ZHEMCHUZHINA, Ye.A.; NYURENBEG, G.Ya.

Effect of the presence in the electrolyte of aluminum metal and salt additives on the stability of cathode blocks during the electrolysis of cryolite-alumina melts. Izv. vys. ucheb. zav.; tsvet. met. 8 no.1:90-95 '65. (MIRA 18:6)

1. Moskovskiy institut stali i splavov, kafedra proizvodstva chistykh metallov i poluprovodnikovyykh materialov.

ZHEMCHUZHINA, Ya.A. (Moskva)

Mechanism of the anode effect, Izv. AN SSSR. Mat. no.3:18-2,

My-Je '65.

(MIRA 18:7)

ZHEMCHUZHINA, Ye.A.; BARABASH, V.A.

Surface phenomena and the electromotive force of polarization  
in an aluminum bath. Izv. vys. ucheb. zav.; tsvet. met. 5  
no.6:86-92 '62. (MIRA 16:6)

1. Moskovskiy institut stali i splavov, kafedra proizvodstva  
chistyykh metallov i poluprovodnikovyykh materialov.  
(Aluminum—Electrometallurgy)  
(Surface chemistry)

BELYAYEV, A.I.; ZHEMCHUZHINA, Ye.A.

Wetting of metallic and refractory materials with molten lithium.  
Sbor. nauch. trud. GINTSVETMET no.33:132-142 '60. (MIRA 15:3)  
(Lithium--Testing) (Wetting--Testing)

BELYAYEV, A.I.; ZHEMCHUZHINA, Ye.A.

Effect of pressure on the leaching of Hungarian bauxites. Izv.vys.  
ucheb.zav.; tsvet.met. 3 no.2:88-95 '60. (MIRA 15:4)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallurgii  
legkikh metallov.  
(Hungary--Bauxites) (Leaching)

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S/081/62/000/009/047/075  
B166/B144

11.3500  
11.2221

AUTHORS: Belyayev, A. I., Zhemchuzhina, Ye. A.

TITLE: Wetting of metallic and refractory materials by molten lithium

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1962, 404, abstract 9K217 (Sb. nauchn. tr. In-t tsvetn. met., M. I. Kalinina, v. 33, 1960, 132-142)

TEXT: The wetting of some types of heat-resistant and stainless steel, iron, nickel, graphite and refractory materials by molten Li at 200-400°C is studied. Molten lithium at 200 and 300°C wets stainless steel and heat-resistant steels worse than it does iron and nickel. At 400°C it is the carbon steels Y12 (U 12) and Y10 (U 10) that are most wetted by lithium. Graphite is worse wetted by molten Li than corundum or talc-magnesite. At 300°C the wettability of graphite by lithium is better than at 400°C. [Abstracter's note: Complete translation.]

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S/137/62/000/005/004/150  
A006/A101

AUTHORS: Belyayev, A. I., Zhemohuzhina, Ye. A.

TITLE: Wetting metal and refractory materials with molten lithium

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1962, 8, abstract 5A53  
("Sb. nauchn. tr. In-t tsvetn. met. im. M. I. Kalinina", 1960,  
vol. 33, 132-142)

TEXT: The optical method was used to measure contact angles of wetting with molten Li surfaces of Fe, steel, Ni, graphite and some refractory materials in chemically pure argon atmosphere. Within the 200 - 400°C range, carbon and stainless steels are less effectively wetted with molten Li than Armco-Fe or Ni. Graphite is worse wetted with Li than corundite or talc-magnesite. Curves which represent graphically the temperature dependence of the contact angle of wetting with Li of Fe or graphite surfaces, pass through a minimum (70 - 80°) at 300°C. It is shown that in all cases an oxidized metal surface is stronger wetted.

[Abstracter's note: Complete translation]

V. Lazarev

Card 1/1

BELYAYEV, A. I. (Moskva); ZHEMOZHINA, Ye. A. (Moskva)

Effect of metallic admixtures in aluminum on the interphase tension  
and metal losses in cryolite-alumina melts. Izv. AN SSSR. Otd. tekhn.  
nauk. Met. i topl. no. 5:11-18 S-O '61. (MIRA 14:10)

1. Krasnoyarskiy institut tsvetnykh metallov.  
(Aluminum--Electrometallurgy)

ZHEMCHUZHINA, Ye.A.

Discussion on the structure and properties of liquid metals.  
Izv. vys. ucheb. zav.; tsvet. met. 4 no.5:201-204 '61.(MIRA 14:10)  
(Liquid metals--Testing)

ZHEMCHUZHINA, Ye.A.; BELYAYEV, A.I.

Effect of direct current superposition on the wetting of graphite  
by alumina-cryolite melts. Izv. vys. ucheb. zav.; tsvet. met. 4  
no.5:123-132 '61.  
(MIRA 14:10)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallurgii  
legkikh metallov.  
(Aluminum—Electrometallurgy)

S/149/61/000/005/008/008  
A006/A101

AUTHOR: Zhemchuzhina, Ye. A.

TITLE: A discussion on the structure and properties of liquid metals

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya,  
no. 5, 1961, 201-204

TEXT: A discussion on the structure and properties of liquid metals was held at the Institute of Metallurgy AS USSR, from January 31 to February 2, 1961. The following reports were delivered: M. I. Shakhparonov on "Some problems of the theory of metal alloys"; A. V. Romanova on "X-ray investigation of the structure of liquid metals"; A. S. Lashko and A. V. Romanova on "X-ray investigation of the structure of liquid metal alloys with eutectics on the phase diagram"; G. M. Martynkevich on "The mechanism of evaporation and structure of condensate"; P. V. Gel'd and M. S. Petrushevskiy on: "Isotherm of surface energy of liquid silicon-iron alloys"; V. N. Yeremenko on surface tension of some intermetallide melts; P. V. Umrikin, N. G. Kurochkin, B. A. Baum on hydrogen surface activity in liquid iron and some of its alloys; V. K. Grigorovich on "The structure of liquid metals in connection with their electronic

Card 1/2

A discussion on the structure ...

S/149/61/000/005/008/008  
A006/A101

structure"; V. V. Nikonova, G. M. Bartenev on some peculiarities of phase diagrams of eutectic type binary alloys in connection with the structure of liquid eutectics. The reports were followed by a discussion which took 50% of the time. The majority of the participants referred to Shakhparonov's report and rejected his opinion on the absence of a connection between the structure of liquid and solid phases. A. O. Spasskiy stated that presently the opinion on a heterogeneous liquid metal phase has been confirmed and submitted a number of examples. A film was shown on the effect of ultrasonic waves on the nature and rate of crystallization. The assembly decided on future trends in studying the liquid state of metals and recommended the investigation of a number of special problems.

Card 2/2

BELYAYEV, A.I.; ZHENCHUZHINA, Ye, A.; FIRSANOVA, L.A.

All-Union Conference on the Physical Chemistry of Fused Salts  
and Slags. Izv. vys. ucheb. zav.; tsvet. met. 4 no.2:162-165  
161. (MIRA 14:6)  
(Chemistry, Physical and theoretical--Congresses)

ZHEMCHUZHINA, Ye.A.; BELYAYEV, A.I.; GAVRILOV, O.R.; DRASHAR, Ya.

Effect of magnesium oxide on the electrolyte properties of  
aluminum baths. Izv. vys. ucheb. zav.; tsvet. met. 4 no. 1:71-  
76 '61. (MIRA 14:2)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra  
metallurgii legkikh metallov.  
(Aluminum—Electrometallurgy) (Magnesium oxide)

S/149/61/000/002/016/017  
A006/A001

AUTHORS: Belyayev, A.I., Zhemchuzhina, Ye.A., Firsanova, L.A.  
TITLE: The All-Union Conference on Physical Chemistry of Molten Salts and Slags  
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tavetnaya metallurgiya, 1961, No. 2, pp. 162 - 165

TEXT: The All-Union Conference on physical chemistry of molten salts and slags was convened from November 22 - 25, 1960 in Sverdlovsk at the Institut elektrokhimii Ural'skogo filiala AN SSSR (Institute of Electrochemistry of the Ural Branch AS USSR). The Conference heard the following reports: Academician A.N. Frunkin's introductory report on the actual development of problems relating to the physical chemistry of molten electrolytes; Yu.K. Delimarskiy, Kiyev, on "Kinetics of Electrode Processes in Molten Salts"; N.K. Voskresenskaya, Moscow, on the present state of investigating thermodynamical properties of molten salts; Yu.V. Baymakov, Leningrad, on "Molten Salt - Metal Equilibrium". A number of reports dealt with results from investigating physico-chemical properties of salt systems, including papers delivered by: M.V. Kamenetskiy, Leningrad, on "Ternary

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S/149/61/000/002/016/017  
A006/A001

The All-Union Conference on Physical Chemistry of Molten Salts and Slags.

Systems of Barium, Potassium, Titanium Chlorides and of Barium, Sodium and Titanium"; V.G. Selivanov, Dnepropetrovsk, on results of investigating the physico-chemical properties of molten fluoro-borate oxides ( $\text{Na}_2\text{BF}_4 - \text{NaF} - \text{B}_2\text{O}_3$ ) and fluoro-titanate-oxide ( $\text{Na}_2\text{TiF}_6 - \text{NaF} - \text{TiO}_2$ ) systems; M.M. Vetyukov, Leningrad, on the properties and structure of melts of the sodium fluoride - aluminum fluoride system; L.A. Firsanova, Moscow, on the physico-chemical properties of cryolitic melts and of aluminum bath electrolytes containing barium chloride; Kh.L. Strel'tsa, Leningrad, on results of investigations into physico-chemical properties of melts of systems corresponding to the electrolytic composition of magnesium baths and containing  $\text{CaCl}_2$  and  $\text{BaCl}_2$ ; A.I. Belyayev, Moscow, on results of investigating molten salts with the aid of radio-active gamma radiation; I.D. Sokolova, Moscow, on "Surface Tension of Molten Salts"; R.V. Chernov, Kiev, on investigating specific electric conductivity of  $\text{TiCl}_3$ - $\text{MeCl}$  melts; B.P. Markov, Kiev, on electro-conductivity of binary salt melts in connection with phase diagrams; G.V. Vorobyev, Sverdlovsk, on results of measuring electric conductivity of systems of molten alkali metal carbonates. A number of reports dealt with results of investigating molten salt-metal systems; N.F. Bukun, Berezniki, on

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results of investigating magnesium dissolution in molten chlorides; A.P. Palkin, Voronezh, on peculiarities in the reaction of salts with metals in mutual systems of displacement in molten state; S.A. Zaretskiy and V.B. Busse-Machukas, Moscow, on equilibria of  $2KCl + Ca \rightleftharpoons 2K + CaCl_2$  and  $Na + KCl \rightleftharpoons NaCl + K$ ; Ye.A. Zhemchuzhina, Moscow, on "The Effect of Metallic Admixtures in Aluminum on Interphase Tension and its Losses in Cryolitic-Alumina Melts"; The electrochemical extraction of zirconium from melts on potassium fluorozirconate base ( $K_2ZrF_6$ ) and alkali metal chlorides was treated in the following reports; A.I. Yevstyukhin, Moscow, on positive results of electrolysis in closed cells with neutral atmosphere; M.V. Smirnov, Sverdlovsk, on equilibrium potentials of zirconium in chloride and mixed fluoro-chloride electrolytes; The following papers were concentrated on physical chemistry of molten slags: V.L. Kheyfets, Leningrad, on "The Conditions of Metals Dissolved in Non-Ferrous Metallurgical Slags"; D.M. Chizhikov, Moscow, on some physico-chemical properties of silicate melts, containing heavy non-ferrous metals; I.N. Zakhatov, Sverdlovsk, on results of investigating the solubility of chromium oxide in molten slags; A.A. Velikanov, Kiev, on "Electrochemical Investigation of Molten Sulfides of Heavy Metals; The Conference recommended to concentrate

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The All-Union Conference on Physical Chemistry of Molten Salts and Slags  
scientific research on the molecular-ionic structure of molten salts and slags;  
thermodynamics of salt and slag melts; the structure of molten electrolytes;  
electrochemical investigation of melts; surface phenomena in electrolytes and  
other fields. It was suggested to convene the next Conference in 1962 in Kiyev.

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AUTHORS: Zhemchuzhina, Ye.A., Belyayev, A.I., Gavrilov, O.R., Drashar, Ya.

TITLE: The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1961, No. 1, pp. 71 - 76

TEXT: It was previously established that the presence of magnesium fluoride ( $MgF_2$ ) in the electrolyte of aluminum cells had a favorable effect on electrolysis. Practically, however, magnesium oxide in the form of caustic or metallurgical magnesite ( $MgCO_3$ ), roasted at 700 or 1,200°C, is used instead of  $MgF_2$ . The authors studied the effect of magnesium oxide on the fusibility, surface properties and the cryolitic ratio of the electrolyte of aluminum cells. The fusibility of cryolite melts was studied by determining the temperature of beginning crystallization of melts using thermal analysis at a cooling rate of 2 - 4° per minute. The temperature of beginning crystallization of  $NaF+AlF_3$  melts was investigated after dissolving in them. a maximum amount of magnesite within one hour at 1,010°C. Data obtained show that a drop of temperature of beginning crystalliza-

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# The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells

tion was observed in all cases when roasted magnesite or pure magnesium oxide were added to the  $\text{NaF}+\text{AlF}_3$  melts. Temperature curves of beginning crystallization of these melts with and without addition of  $\text{MgF}_2$  were located much higher than liquidus lines of melts containing magnesium oxide. The drop of temperature under the effect of  $\text{MgO}$  is obviously caused by the decomposition of a portion of cryolite by magnesium oxide according to the reaction:  $2\text{Na}_3\text{AlF}_6 + 3\text{MgO} \rightarrow 3\text{MgF}_2 + 6\text{NaF} + \text{Al}_2\text{O}_3$  (1). Changes in the wetting contact angles and surface properties were established by measuring the contact angles at  $1,010^\circ\text{C}$  of  $\text{NaF}+\text{AlF}_3$  melts with a cryolitic ratio of 2.2; 2.4; 2.5; 2.6 and 2.7, containing roasted magnesite in an amount capable of being dissolved within 1 hour at the given temperature. It was found that the contact angles increased with a higher cryolitic ratio. This was obviously caused by the increased solubility of both caustic and metallurgical magnesite due to a higher cryolitic ratio and due to a stronger effect of surface-active complex  $\text{MgF}_2$  ions forming mainly in less acid melts  $\text{Na}_3\text{AlF}_6 + 3\text{MgF}_2 = 3\text{NaMgF}_3 + \text{AlF}_3$  (2) and reducing the activity of  $\text{Na}^+$  ions. To compare the effect of  $\text{MgF}_3$  and  $\text{MgO}$  additions on changes in the contact angles and consequently on the interfacial tension of  $\text{NaF}+\text{AlF}_3$  melts on the border with carbon, the contact angles of these melts were measured at a different cryolitic ratio in the presence of 5

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# The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells

weight % caustic magnesite or 5%  $MgF_2$ . It was found that in melts with a cryolitic ratio equal to 2.5, 2.6 and 2.7, the addition of  $MgO$  had a lesser effect on the increase of interfacial tension than  $MgF_2$ . The degree of changes in the electrolyte cryolitic ratio after addition of  $MgO$ , was investigated by melting in a corundum crucible at  $1,000^{\circ}C$ , 35 g  $NaF+AlF_3$  salt mixture with a definite cryolitic ratio, containing 5 weight %  $Al_2O_3$  and a given amount of  $MgO$ . The cryolitic ratio of the melt was determined by calculation and by titration with sodium fluoride. The calculation was based on the full interaction of the whole magnesium oxide according to reaction (3):  $3MgO + 2AlF_3 \rightarrow 3MgF_2 + Al_2O_3$ . The calculation of the cryolitic ratio after titration was made by the formula  $\frac{3a - 2b}{a + b}$  where a is the electrolyte batch in g, and b is the  $NaF$ -weight in g used for titration. In all cases, when adding  $MgO$  to the cryolite-alumina melt, an increase in the cryolitic ratio was observed. Dissimilar data on changes of this ratio, being determined by hot titration and by calculation, show that more complicated processes than a simple interaction of  $MgO$  with  $AlF_3$  take place in the  $NaF + AlF_3$  melt when  $MgO$  is introduced. This may result from reaction(3) and from the interaction of magnesium

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The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells  
fluoride with cryolite which is accompanied by the formation of  $AlF_3$  in the melt  
according to reaction (2).

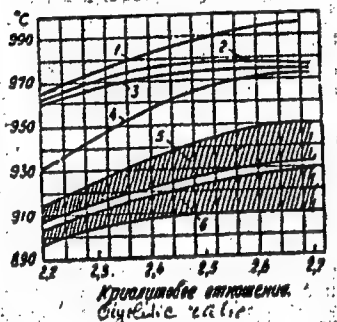


Figure 1

Temperature of beginning crystallization for pure  $NaF + AlF_3$  melts (1) and melts with addition of 5%  $MgF_2$  (2), 7.5%  $MgF_2$  (3), 7.1% pure  $MgO$  (4), 5.8% metallurgical magnesite (5), and 7.23% caustic magnesite (6).

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The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells

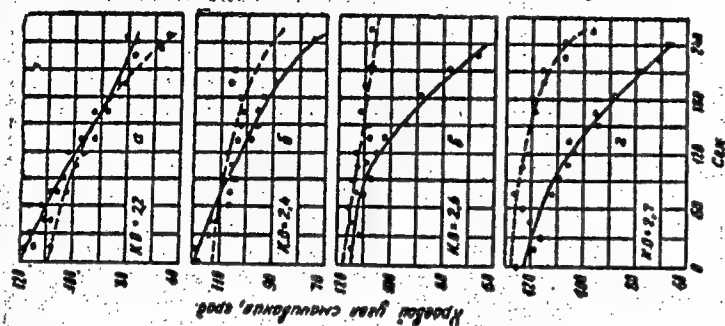


Figure 3

The effect of admixtures of 5% MgO (continuous lines) and 5% MgF<sub>2</sub> (dotted lines) on wetting contact angles of cryolite melts depending on time and the cryolitic ratio.

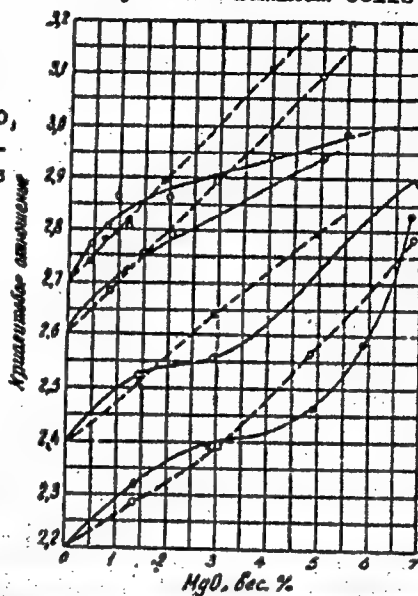
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# The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells

Figure 4

- The effect of MgO on changes in the cryolitic ratio, determined by titration (continuous lines) and calculation (dotted lines) at initial cryolitic ratios of 2.2; 2.4; 2.6 and 2.7.



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The Effect of Magnesium Oxide on the Properties of Electrolyte in Aluminum Cells

There are 1 table and 4 figures.

ASSOCIATIONS: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals); Kafedra metallurgii legkikh metallov (Department of Metallurgy of Light Metals)

SUBMITTED: December 17, 1959

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MUKHINA, Z.S.; ZHEMCHUZHNAYA, I.A.; KOTOVA, G.S.

Analysis of impurities in refractory alloys based on nickel, cobalt,  
iron, and chromium. Zhur.anal.khim. 17 no.2:170-173 Mr-Ap '62.  
(MIRA 15:4)

(Alloys) (Metals--Analysis)

MUKHINA, Z.S.; TIKHONOVA, A.A.; ZHEMCHUZHNAYA, I.A.

Determining lead, bismuth, tin, cadmium impurities in niobium and  
niobium alloys. Trudy Kom. anal. khim. 12:71-74 '60. (MIRA 13:8)  
(Niobium--Analysis)

MUKHINA, Z.S.; TIKHONOVA, A.A.; ZHEMCHUZHAYA, I.A.

Detecting traces of lead, tin, bismuth and cadmium in metallic chromium and its alloys. Trudy Khim. anal. khim. 12:298-310 '60.

(Chromium--Analysis)

(MIRA 13:8)

Sabatini, R.P., and R.L. Fugate. Spectral Determination of Aduartures in  
Water

TABLE I BOOK DESCRIPTION

507/343

Abstracts and Index. Analytical and qualitative methods.

Study of the physical properties of alloys and alloys (Methods of determining mechanical properties of alloys). Moscow, 1960. 111 p. (Series: Sci. Tech. 12) 3,500 copies printed.

Bibliography. This collection of articles is intended for chemists, metallurgists, and engineers.

CONTENTS: The articles describe methods for detecting and separating various elements and their traces in pure metals. Also discussed are methods for the spectrochemical, electrochemical, spectrophotometric and instrumental methods for analyzing materials of high purity. The editors state that these methods have been developed within the last five or six years by various Soviet scientific institutions, and are now widespread in research and factory laboratories of the country. The articles are written in Russian. References, mostly Soviet, are given.

Aluminum, 24. 25. Gallium, 24. Indium, 24. Lead, 24. Tin, 24. Zinc, 24. Zirconium, 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.

Aluminum, 24. 25. Gallium, 24. Indium, 24. Lead, 24. Tin, 24. Zinc, 24. Zirconium, 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.

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GAVRILOV, S.A.; ZHEMCHUZHNIKOV, A.A.

Precast reinforced-concrete supports of rotary kilns. Prom. stroi.  
38 no.11:21-22 '60. (MIRA 13:10)

(Precast concrete construction)  
(Kilns, Rotary)

GAVRILOV, S.A.; ZHEMCHUZHNIKOV, A.A.

Precast reinforced concrete foundations for rotary cement kilns.  
Sbor.trud. Novorossiyskotskaya no.1:55-61 '61. (MIRA 16:2)  
(Kilns, Rotary—Foundations)  
(Precast concrete construction)

ACC NR: AF7000788

(A,N)

SOURCE CODE: UR/0089/66/021/005/0363/0363

AUTHOR: Bulkin, Yu. M.; Zhirnov, A. D.; Zhemchuzhnikov, G. N.; Konstantinov, L. V.; Nikolayev, V. A.; Stenbok, I. A.; Lobanov, V. S.; Filippov, A. G.; Khryastov, N. A.

ORG: none

TITLE: Research and educational reactor IR-100

SOURCE: Atomnaya energiya, v. 21, no. 5, 1966, 363-368

TOPIC TAGS: research reactor, nuclear reactor characteristic/ IR-100 reactor

ABSTRACT: The authors describe the construction, the physical and technical characteristics, and the experimental capabilities of a research reactor with thermal rating of 100 kw, intended for scientific research work and also for training of specialists in the field of atomic energy. This is a water-cooled and water-moderated swimming-pool reactor with all the equipment situated in a central building. It uses enriched  $UO_2$  (10%), with a minimum critical mass of 2.6 kg of  $U^{235}$ , and a graphite reflector. The maximum thermal and fast neutron fluxes are  $2 \times 10^{12}$  and  $2.2 \times 10^{12}$ , respectively. The various channels and the possible research that can be carried out with the reactor, as well as the general construction, are described in some detail. Orig. art. has: 2 figures and 2 tables.

SUB CODE: 18/

SUBM DATE: 28Jul66/

ORIG REF: 002/

OTH REF: 003

Cord 1/1

UDC: 621.039.520.21

TRUFYAKOV, V. I. - inzhener i, ZHENCHUZHNIKOV, G. V. - Inzh., SHEVERNITSKIY, V. V. -  
Kand. Tekhn. Nauk St. Nauchn. Sotr., NOVIKOV, V. I. - Inzh.

Institut elektrosvarki im. akad. Ye. O. Patona Akademii nauk USSR

STATICHESKAYA PROCHNOST' SVARNYKH SOYEDINENIY IZ MALOUGLERODISTOY STALI

SO: Collection of Annotations of Scientific Research Work on Construction, completed  
in 1950. Moscow, 1951

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ZHEMCHUZHNIKOV, G. V.

"The Effect of Defects in Welded Seams on the Static Strength of Three Types of Welded Seams." Cand Tech Sci, Inst of Structural Mechanics, Acad Sci UkSSR, Kiev, 1955. (KL, No 17, Apr 55 ).

SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (16).

USER/ [illegible]

Card

Authors :

Title :

Periodical :

Abstract :

**ZHEMCHUZHNIKOV, G.V.**

Effect of pores in welds on the static strength of welded joints with longitudinal and transverse welds. Avtom.svar. 8 no.2:34-43 Mr-Apr '55.  
(MIRA 8:7)

1. Orden Trudovogo Krasnogo Znameni Institut elektrosvarki imeni Ye.O. Patona, Akademiya nauk USSR. (Welding--Cold weather conditions)

CHEMCHUZHNIKOV

SHEVERNITSKIY, V.V.; ZHECHUZHNIKOV, G.V.

Welded joints in stretched elements of metal structures at low temperatures. Avtom. svar, 10 no.1:51-54 Ja-F '57. (MLRA 10:4)

1. Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im. Ye.O. Patona AN USSR.  
(Structural frames--Welding) (Metals at low temperatures)

L 23415-66 EWT(d)/EWT(m)/EWP(w)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k) :P(c) JD/HM/HW/  
ACC NR: AP6004137 (N) SOURCE CODE: UR/0125/66/000/001/0034/0039 EM

AUTHOR: Zhemchuzhnikov, G. V.; Girenko, V. S.; Karata, N. L.; Kotenko, E. V.

ORG: Institute of Electric Welding in. Ya. O. Paton, AN UkrSSR (Institut elektros-  
varki)

TITLE: Effect of stress concentrators on the strength of steel following preliminary  
deformation and aging

SOURCE: Avtomaticheskaya svarka, no. 1, 1966, 34-39

TOPIC TAGS: stress concentration, low carbon steel, low alloy steel, plastic de-  
formation, metal aging, brittleness

ABSTRACT: The brittle cracks arising in metal structure under the action of static  
loads in most cases originate from structural or technological stress concentrators  
and hence in recent years special attention has been paid to research into the effect  
of notching on brittle strength. This is particularly important considering that work  
hardening due to the welding, straightening or overloading of the structural elements  
and the concomitant aging of the metal, although it greatly affects the susceptibility  
of steel to geometric stress concentrators, has previously been relatively uninvest-  
igated although it is an important factor in structural strength. On the basis of  
tensile tests of notched specimens of rimmed low-carbon sheet steel at from +30 to

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UDC: 621.791.762:539.56:669.140

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ACC NR: AP6004137

-190°C it is established that the transition from ductile (fibrous) to brittle fracture (at +20°C) is not accompanied by any significant decrease in strength: if the loading is applied uniformly, the rated rupture stresses remain above the yield point. This implies that the ductile-to-brittle transition temperature is far from always dangerous. The critical temperature at which rated strength sharply decreases (in the above case, -70°C) is several tens of degrees lower than the transition temperature, and for most grades of low-carbon and low-alloy steels this critical temperature is below -60°C. This means that when in natural state (in the form of structural elements at normal temperatures of the atmosphere) these steels are sufficiently resistant to brittle cracking. Work hardening and the attendant aging, however, may markedly enhance the brittleness of steel and displace the threshold of rated strength in the direction of positive temperatures, as established by preliminary 10% plastic deformation of notched specimens with their subsequent furnace aging at up to +250°C for 2 hr. Thus, preliminary deformation at 100-250°C causes particularly marked embrittlement: the critical temperature of transition from ductile to brittle fracture rises nearly 100°C as compared with metal in natural state. Orig. art. has: 3 tables, 6 figures.

SUB CODE: 11, 13/ SUBM DATE: 06Jul65/ ORIG REF: 004/ OTH REF: 006

Card 2/2 dda

1. 12/15/66 ZWT(m)

ACC NR: AP6018364

SOURCE CODE: UR/0089/66/020/005/0450/0451

AUTHOR: Zhemchuzhnikov, G.

ORG: none

TITLE: Conference on research reactors

SOURCE: Atomnaya energiya, v. 20, no. 5, 1966, 450-451

TOPIC TAGS: nuclear physics conference, research reactor, neutron flux, nuclear reactor, neutrino, reactor control, nuclear reactor technology/MR research reactor, SM-2 research reactor, VVR-M nuclear reactor, IRT nuclear reactor, VVR nuclear reactor, VVR-S nuclear reactor

ABSTRACT: The Fourth Working Conference on Physics and Engineering of Research Reactors, held in Budapest in November 1965, was attended by representatives from Bulgaria, Hungary, East Germany, Poland, Rumania, USSR, Czechoslovakia, the Chinese People's Republic, and the Joint Institute of Nuclear Research. A total of 102 papers dealing with the modification of existing research reactors, reactor dynamics, and critical assemblies were presented. The highlights of some of these papers are given below.

S. M. Feynberg (USSR) presented a paper on the future development of

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<sup>19</sup>  
research reactors. He reported that during the past decade, the thermal neutron flux intensity in research reactors has increased from  $3 \times 10^{14}$  to  $3 \times 10^{15}$  n/cm<sup>2</sup>·sec, and present trends indicate a further increase to  $2-5 \times 10^{16}$  n/cm<sup>2</sup>·sec. The specific power in the core ten years ago amounted to only about 50 kw/l as compared with the present 2500 kw/l (SM-2 reactor). Feynberg also discussed some problems associated with the development of "loop-" and "beam"-type reactors and presented some data on the MIF beam-type reactor which generates a neutron flux of  $10^{11}$  n/cm<sup>2</sup>·sec at the beam-tube exit. He also disclosed certain design features of a neutrino generator which, during operation in high-power pulsed regimes, can produce a favorable relationship between the cosmic and radioactive background and the useful effects; this would permit the use of research reactors in a new field -- research on the properties of neutrinos.

The paper "Physical problems in the development of fast power reactors" presented by M. N. Nikolayev (USSR) aroused great interest at the conference. He discussed the present status of reactor and neutron physics and the basic problems which have arisen in the development of the current fast power reactors.

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V. V. Goncharov and V. A. Tsykanov reported on the operation of the MR and SM-2 research reactors. They described the results of the testing of individual reactor components, the operation of experimental loops and channels, and the radiation stability of reflector materials and other internal structures. Considerable attention was devoted to the problem of increasing the power of currently operational IRT and VVR reactors to 5-10 Mw and higher.

G. N. Zhemchuzhnikov and P. M. Yegorenkov (USSR) presented new methods of increasing the power of a typical IRT reactor by employing new types of fuel elements and new methods of heat removal from the reactor core.

A plan for modernizing the VVR-M reactor in order to expand its experimental capabilities was presented by K. A. Konoplyev (USSR). He proposed installing a special hot chamber above the reactor; this would be equipped with a viewing system and manipulators.

Ye. Aleksandrovich (Poland) reported on the work being done to modify the EVA reactor to raise its power from 4 to 10 Mw by installing fuel element assemblies similar to those used in VVR-M reactors. Simi-

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lar efforts were described by representatives from Czechoslovakia and Hungary. Reports were also presented on the current status of experimental research being conducted on IRT and VVR reactors.

The representatives from Hungary and Bulgaria described some methods of measuring fuel element temperatures. A number of papers were devoted to the development of modern control and measuring equipment for the reactor control and safety systems. The Rumanian representative in his paper on an "Automatic control system for the VVR-S reactor" described the use of standard time functions for setting the power level and insuring that it varies exponentially, thus eliminating the process of taking logarithms and differentiating. The unit of the standard time functions consists of two operational amplifiers - an integrating and a summing amplifier. The feedback of the integrating amplifier circuit, and the initial conditions and the gain are different for different operating regimes.

The paper entitled "New simplified semiconductor-type control and measuring equipment for a control and safety system for an experimental nuclear reactor" (Poland) outlines the dynamics of the operations of the new system under various regimes. This system makes it possible to increase starting reliability and improve static accuracy and the dynamic

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